microorganisms, cells and animals to make useful proteins'. However, in their final expanded, revised and updated form they succeed in providing a worthwhile contribution to the current understanding of this aspect of biotechnology. This book discusses the nature and importance of the production of therapeutically useful proteins in greater depth than the general books on biotechnology on the market and thus will be helpful in providing a comparatively recent 'state of the art' picture for research workers in this field. Although ostensibly a specialised book it will also be useful to final year undergraduates as a reference source for some of the applications of genetic engineering. Although the index is rather limited for a book of this depth of content, there is a useful table of contents and the individual chapters are well documented.

There are three main areas of subject material in this book: microbial systems and mammalian systems for protein production and thirdly the discovery, design and usage of proteins as therapeutic agents. It is of considerable interest that yeast systems are now being used successfully in the production of proteins for clinical use, such as human serum albumin (HSA) and this is discussed in chapter 5. Chapter 3 describes the development of vaccines, in particular against the human hepatis B virus by the expression of the viral surface antigen protein (HBsAg) in transformed yeast. The use of yeast secretion vectors to express the domains (modules) of mosaic proteins, such as those from the blood clotting pathway, with secretion directly into the extracellular medium is examined in chapter 4.

Tissue-type plasminogen activator (t-PA) is a protein of great therapeutic potential. It activates plasminogen to the plasmin required to lyse the blood clots, in the coronary artery, that are a contributory factor to acute myocardial infarction. The expression of t-PA and related enzymes in mammalian cells is discussed in chapters 6 and 8 and the remarkable possibility of producing t-PA in the milk of transgenic animals is examined in chapter 11.

Proteins are amongst the largest drugs used and in contrast to most therapeutic agents a protein molecule is not fully defined by its 'chemical formula'. This is because the tertiary structure can not as yet be fully predicted from the known amino acid sequence. The potential and problems of proteins as therapeutic agents and their selective delivery and targeting are the subjects of chapters 17 and 16, respectively. In chapter 14 the importance of recombinant receptor protein analysis in the rational design of drugs at the molecular level is debated.

This interesting book clearly indicates the great potential and diversity of the production of therapeutically useful proteins by biotechnology. These include insulin, growth hormone, HSA, HBsAg, t-PA and erythropoietin (chapter 15), which are now available through the powerful methods of biotechnology as applied to a variety of microbial and mammalian cellular systems.

Helen Wiseman

Short Protocols in Molecular Biology; Edited by F.M. Ausubel, R. Brent, R.E. Kingston, D.D. Moore, J.G. Seidman, J.A. Smith and K. Struhl; John Wiley; New York, 1989; xxii + 387 pages; £31.65

This laboratory manual, spirally bound so that it lies flat on the bench and with a very arty cover, is a condensed version of the extremely weighty Current Protocols in Molecular Biology. A comparison of the two quickly reveals that they contain essentially the same set of recipes. What this new version lacks is the italics present in Current Protocols explaining why a particular step is of importance. For example, the description of how to make RNA from animal tissue is identical but you are not told in the Short Protocols why Sarkosyl is excluded from the homogenisation step (a frothy mess will result!). Having reviewed and used Current Protocols I think that this is a pity as an understanding of the potential pitfalls of a technique is a key part of using it successfully. All of the standard techniques of molecular biology are covered in the book with the exception of the polymerase chain reaction which is mentioned but not in anything like the detail which its widespread use these days would warrant. I found this a curious oversight particularly when this series is supposed to be updated on a quarterly basis; in 1989 (when it was published) which lab did not have a PCR machine? Like its parent volume, Short Protocols is an easy book to use and has some of the same clear diagrams. It contains a useful glossary and recipe section and a limited, but worthwhile reference section.

Short Protocols is, as it claims to be, a book designed for those who are familiar with the principles but want the basic steps. I cannot really see the circumstances under which anyone would want to have both of these books but either of them would make a useful contribution to the lab. I have to say that £31.65 is rather expensive for a spirally bound book but it is still one-third of the price of Current Protocols.

Keith Dudley

Cellular and Molecular Biology of Muscle Development; Edited by L.H. Kedes and F.E. Stockdale; Alan R. Liss; New York, 1989; xxxv + 1059 pages, $195.00.

Sometimes the grass is greener in the neighbouring scientific plot though I cannot pretend to have found it so in the case of muscle developmental biology. The field used to resemble a bog. This book shows that the scene has changed: there are decent islands of firm ground, patches of green are appearing. This is primarily due to the application of molecular genetics,

and it is notable that the more molecular genetic-like the articles are in this book, the more compelling they are. Doing hybridisations extends the range of developmental observations beyond what is possible with antibodies, but it does not really grasp the problem. Getting at the muscle-specific sequences of the flanking regions of muscle protein genes does. So does the use of *Drosophila* and *C. elegans* to introduce mutant proteins and thereby dissect the assembly of filaments and ultimately the contractile process.

Still, it has to be said that 86 contributions amounting to over a thousand pages of a camera-ready format (albeit on glossy paper) derived from a conference is a pretty daunting prospect. What are the major topics? Let us suppose there are about four muscle development stages: commitment leading to myoblast proliferation, cessation of division leading to myotube formation, one or more stages of embryonic and adult development and plasticity. Further assume there are five major gene families: myosin, actin, troponin-tropomyosin, cytoskeleton proteins, extracellular matrix proteins. Lastly, suppose there are four animals of major interest: man, mouse, fruit fly, nematode. Multiplication of these three factors would yield a number of topics which is not far short of the number of contributions and comes close to the list of contents, especially as the last chapter is on human muscle disease. Of course the spread is not actually even; myosin and actin are more popular than the other proteins, development per se is more closely studied in vertebrates and so on. What is surprisingly missing is most of the MyoD story, the observation that one gene is responsible for terminal differentiation and the sequels to this observation. While much of this story unravelled in 1989 and 1990, it must have been a hot topic at the time of the conference in April 1988.

For anyone in the field this is an essential volume, though probably for the library at the price. For anyone in a neighbouring field, it is strongly recommended: perseverance brings its reward.

R.M. Simmons

The Use of HPLC in Receptor Biochemistry; Editing A.R. Kerlavage; Alan R. Liss; New York, 1989; x + 256 pages; $96.00

One of the most difficult tasks today facing the scientist studying receptors is correlating volumes of biological and pharmacological evidence, obtained over several decades, with newly determined receptor sequences, obtained only in the last seven years. During roughly the same time HPLC has matured into an extremely powerful tool for purifying and studying the structure of proteins and peptides. Scientists discovered that the same techniques used to study soluble proteins could be applied to membrane receptors and as purified receptor proteins became available in reasonable quantity.

The articles presented in this volume are written by scientists who have had many years of experience with HPLC, both with receptors and with other systems. The purpose of this volume is to provide for those interested in the study of receptors a background in HPLC methodology and examples of some of the advances made in the receptor field as a result of its application. There is an excellent technical summary of HPLC and a discussion of the various modes of the HPLC which are most applicable to particular problems, and including such details as a list of packing materials available, suppliers, function(s) of the packing material, etc. The use of HPLC in the synthesis, purification and characterisation of synthetic peptides is discussed in very good detail. Synthetic peptides have become increasingly important in the receptor field, being used to elicit specific antibodies to known receptor sequences, as ligands to study peptide receptors, and as inhibitors of the interactions between receptors and other proteins. The isolation of endogenous peptides is described, with emphasis upon maintaining biological activity, and also the mapping of receptors using HPLC techniques, which has greatly advanced the knowledge of receptor structure and function. There is a detailed discussion of the application of a side range of HPLC modes to the study of steroid hormone receptors. The final chapter presents a highly detailed strategy for isolating small amounts of proteins and peptides for microsequence analysis.

At the conclusion of each chapter there is an extensive bibliography with almost all the references cited being of recent date, and including the titles of the papers quoted. In all chapters there are a number of examples discussed in detail, including a reference to some of the problems that a novice entering the field of HPLC for the first time may encounter, and also comprehensive references to others.

This clearly written and well-organised volume represents a bringing together of information concerning the techniques and applications of HPLC in the efforts to determine the links between the structure and observed biology of membrane receptors. It should prove a valuable aid to those engaged in, or considering entry into, this field. It is highly recommended, in particular to those who wish to bring themselves up-to-date in this area of membrane research, and also to those who wish to become aware of the problems/difficulties with the use of the technique.

Norma M. Ryan

Biophysical Chemistry of Membrane Function; A. Kotyk, K. Janáček and J. Koryta; John Wiley, Chichester, 1988; xvii + 377 pages; £45.00

This textbook because of its interdisciplinary requirements has contributions by three authors although a great deal of the book is nevertheless written by Professor Kotyk. The biomembrane field in fact requires such an interdisciplinary approach both in its research endeavours and for its presentation. Physicists, biochemists, physiologists, cell biologists and